IN THE CLAIMS:

1. (Currently Amended) A method for estimating data transmission rate in a communication system with variable data transmission rates wherein a transmission signal includes a plurality of data symbols over a sequence of data frames, comprising:

classifying a data frame of a received transmission signal in accordance with a predefined classification of the data transmission rates; and

estimating the data transmission rate of the received data frame on basis of said classification;

wherein the data frames are classified based on a power spectral density function estimate of the received transmission signal.

2. (Original) A method according to claim 1, wherein the data frames are classified based on frequency content of the received transmission signal.

3. (Canceled).

4. (Currently Amended) A method according to claim ~~3~~1, wherein the power spectral density function estimate of the received transmission signal is calculated using a Fast Fourier Transform algorithm and coherent averaging of the data symbol sequence of the received transmission signal.

5. (Original) A method according to claim 4, wherein a modified Fast Fourier Transform algorithm is used, said modified Fast Fourier Transform algorithm taking predefined symmetries of the transmitted data symbols into account.

6. (Currently Amended) A method according to claim ~~3~~1, wherein the estimation of the power spectral density function comprises the steps of:

dividing the total number of received data symbols into blocks, wherein each block includes a predefined amount of consecutive points of the signal;

calculating an individual Fourier Transform for each of said blocks for receiving squared real and imaginary points for each frequency of the signal;

calculating an individual power spectral function estimate of each of the blocks by summing the squared real and imaginary points; and

calculating the power spectral density function estimate by averaging the individual power spectral function estimates.

7. (Currently Amended) A method according to claim ~~3~~1, wherein the power spectral density function estimate is normalised by summing the elements of the power spectral density function for obtaining a sum of the elements and by dividing each of said elements by the sum.

8. (Previously Presented) A method according to claim 1, wherein the classification further comprises a step of removing effects of noise.

9. (Previously Presented) A method according to claim 8, wherein the data frames are classified based on a power spectral density function estimate of the received transmission signal, the noise removal comprising subtracting an inverse of the number of elements of the power spectral density function from the power spectral density function.

10. (Currently Amended) A method according to claim ~~3~~1, wherein the classification comprises further:

calculating a variable from the power spectral density function for characterising the frequency content of the power spectral density function; and

comparing the variable against limit values of a classification decision structure.

11. (Original) A method according to claim 10, wherein the variable characterising the frequency content of the received transmission signal comprises center-of-moment of the power spectral density function.

12. (Previously Presented) A method according to claim 10, wherein the magnitude of the variable indicates the relative amount of high frequencies present in the power spectral density function.

13. (Previously Presented) A method according to claim 1, wherein the communication system comprises a cellular code division multiple access communications network, and the data is transmitted between a mobile station and a base station of the network over a radio interface.

14. (Previously Presented) A method according to claim 1, wherein the number of data transmission rate classes of the predefined classification equals the number of the possible data transmission rates.

15. (Previously Presented) A method according to claim 1, wherein the number of data transmission rate classes of the predefined classification is lower than the number of the possible data transmission rates.

16. (Currently Amended) A method for channel estimation in a cellular code division multiple access communication system wherein a plurality of data symbols is spread over a sequence of data frames in a transmission signal with variable data transmission rates, comprising:

classifying a data frame of a received transmission signal in accordance with a predefined classification of the data transmission rates; and

estimating the data transmission rate of the received data frame on basis of said classification;

wherein the data frames are classified based on a power spectral density function estimate of the received transmission signal.

17. (Original) A method according to claim 16, wherein the estimate of the data transmission rate is used to assist in rate selection for Viterbi decoding of the received data symbols.

18. (Previously Presented) A method according to claim 16, wherein a data rate information received from a transmitting station and the estimate data transmission rate are both used for the channel estimation.

19. (Currently Amended) Signal receiving circuitry for use in a communication system with variable data transmission rates wherein data is transmitted as a plurality of data symbols over s sequence of data frames, the signal receiving circuitry comprising a rate estimation unit for receiving an incoming transmission signal, for classifying a data frame of the signal in accordance with a predefined classification of the data transmission rates, and for determining from the results of the classification an estimate of the data transmission rate of the received data frame;

wherein the rate estimation unit is arranged to classify the received signal based on a power spectral density function estimate of the received transmission signal.

20. (Original) Signal receiving circuitry according to claim 19, wherein the rate estimation unit estimates the data transmission rate based on the frequency content of the received signal.

21. (Canceled).

22. (Previously Presented) Signal receiving circuitry according to claim 19, comprising a channel estimation unit which utilises the estimate data transmission rate of the received signal in channel estimation.

23. (Currently Amended) A mobile station including signal receiving circuitry arranged for use in communication via a communication system with variable data transmission rates wherein data is transmitted as a plurality of data symbols over a sequence of data frames, the signal receiving circuitry comprising a rate estimation unit for receiving an incoming transmission signal, for classifying a data frame of the signal in accordance with a predefined classification of the data transmission rates, and for determining from the results of the classification an estimate of the data transmission rate of the received data frame;

wherein the rate estimation unit is arranged to classify the received signal based on a power spectral density function estimate of the received transmission signal.

24. (Currently Amended) A base station including signal receiving circuitry for use in communication with variable data transmission rates wherein data is transmitted as a plurality of data symbols over a sequence of data frames, the signal receiving circuitry comprising a rate estimation unit for receiving an incoming transmission signal, for classifying a data frame of the signal in accordance with a predefined classification of the data transmission rates, and for determining from the results of the classification an estimate of the data transmission rate of the received data frame;

wherein the rate estimation unit is arranged to classify the received signal based on a power spectral density function estimate of the received transmission signal.

25. (New) A method for estimating data transmission rate in a communication system with variable data transmission rtes wherein a transmission signal includes a plurality of data symbols over a sequence of data frames, comprising:

classifying a data frame of a received transmission signal in accordance with a predefined classification of the data transmission rates; and

estimating the data transmission rate of the received data frame on basis of said classification;

wherein the data frames are classified based on a power spectral density function estimate of the received transmission signal; and

wherein the estimation of the power spectral density function comprises the steps of:

dividing the total number of received data symbols into blocks, wherein each block includes a predefined amount of consecutive points of the signal;

calculating an individual Fourier Transform for each of said blocks for receiving squared real and imaginary points for each frequency of the signal;

calculating an individual power spectral function estimate of each of the blocks by summing the squared real and imaginary points; and

calculating the power spectral density function estimate by averaging the individual power spectral function estimates.

26. (New) A method for channel estimation in a cellular code division multiple access communication system wherein a plurality of data symbols is spread over a sequence of data frames in a transmission signal with variable data transmission rates, comprising:

classifying a data frame of a received transmission signal in accordance with a predefined classification of the data transmission rates; and

estimating the data transmission rate of the received data frame on basis of said classification;

wherein the data frames are classified based on a power spectral density function estimate of the received transmission signal; and

wherein the estimation of the power spectral density function comprises the steps of:

dividing the total number of received data symbols into blocks, wherein each block includes a predefined amount of consecutive points of the signal;

calculating an individual Fourier Transform for each of said blocks for receiving squared real and imaginary points for each frequency of the signal;

calculating an individual power spectral function estimate of each of the blocks by summing the squared real and imaginary points; and

calculating the power spectral density function estimate by averaging the individual power spectral function estimates.

27. (New) Signal receiving circuitry for use in a communication system with variable data transmission rates wherein data is transmitted as a plurality of data symbols over s sequence of data frames, the signal receiving circuitry comprising a rate estimation unit for receiving an incoming transmission signal, for classifying a data frame of the signal in accordance with a predefined classification of the data transmission rates, and for determining from the results of the classification an estimate of the data transmission rate of the received data frame;

wherein the rate estimation unit is arranged to classify the received signal based on a power spectral density function estimate of the received transmission signal; and

wherein the rate estimation unit is arranged to estimate the power spectral density function by

dividing the total number of received data symbols into blocks, wherein each block includes a predefined amount of consecutive points of the signal;

calculating an individual Fourier Transform for each of said blocks for receiving squared real and imaginary points for each frequency of the signal;

calculating an individual power spectral function estimate of each of the blocks by summing the squared real and imaginary points; and

calculating the power spectral density function estimate by averaging the individual power spectral function estimates.

28. (New) A mobile station including signal receiving circuitry arranged for use in communication via a communication system with variable data transmission rates wherein data is transmitted as a plurality of data symbols over a sequence of data frames, the signal receiving circuitry comprising a rate estimation unit for receiving an incoming transmission signal, for classifying a data frame of the signal in accordance with a predefined classification of the data transmission rates, and for determining from the results of the classification an estimate of the data transmission rate of the received data frame,

wherein the rate estimation unit is arranged to classify the received signal based on a power spectral density function estimate of the received transmission signal; and

wherein the rate estimation unit is arranged to estimate the power spectral density function by

dividing the total number of received data symbols into blocks, wherein each block includes a predefined amount of consecutive points of the signal;

calculating an individual Fourier Transform for each of said blocks for receiving squared real and imaginary points for each frequency of the signal;

calculating an individual power spectral function estimate of each of the blocks by summing the squared real and imaginary points; and

calculating the power spectral density function estimate by averaging the individual power spectral function estimates.

29. (New) A base station including signal receiving circuitry for use in communication with variable data transmission rates wherein data is transmitted as a

plurality of data symbols over a sequence of data frames, the signal receiving circuitry comprising a rate estimation unit for receiving an incoming transmission signal, for classifying a data frame of the signal in accordance with a predefined classification of the data transmission rates, and for determining from the results of the classification an estimate of the data transmission rate of the received data frame,

wherein the rate estimation unit is arranged to classify the received signal based on a power spectral density function estimate of the received transmission signal; and

wherein the rate estimation unit is arranged to estimate the power spectral density function by

dividing the total number of received data symbols into blocks, wherein each block includes a predefined amount of consecutive points of the signal;

calculating an individual Fourier Transform for each of said blocks for receiving squared real and imaginary points for each frequency of the signal;

calculating an individual power spectral function estimate of each of the blocks by summing the squared real and imaginary points; and

calculating the power spectral density function estimate by averaging the individual power spectral function estimates.

30. (New) A method for estimating data transmission rate in a communication system with variable data transmission rtes wherein a transmission signal includes a plurality of data symbols over a sequence of data frames, comprising:

classifying a data frame of a received transmission signal in accordance with a predefined classification of the data transmission rates; and

estimating the data transmission rate of the received data frame on basis of said classification;

wherein the data frames are classified based on a power spectral density function estimate of the received transmission signal; and

wherein the classification comprises further:

calculating a variable from the power spectral density function for characterising the frequency content of the power spectral density function; and

comparing the variable against limit values of a classification decision structure, wherein the variable characterising the frequency content of the received

transmission signal comprises center-of-moment of the power spectral density function.

31. (New) A method for channel estimation in a cellular code division multiple access communication system wherein a plurality of data symbols is spread over a sequence of data frames in a transmission signal with variable data transmission rates, comprising:

classifying a data frame of a received transmission signal in accordance with a predefined classification of the data transmission rates; and

estimating the data transmission rate of the received data frame on basis of said classification;

wherein the data frames are classified based on a power spectral density function estimate of the received transmission signal; and

wherein the classification comprises further:

calculating a variable from the power spectral density function for characterising the frequency content of the power spectral density function; and

comparing the variable against limit values of a classification decision structure, wherein the variable characterising the frequency content of the received transmission signal comprises center-of-moment of the power spectral density function.

32. (New) Signal receiving circuitry for use in a communication system with variable data transmission rates wherein data is transmitted as a plurality of data symbols over s sequence of data frames, the signal receiving circuitry comprising a rate estimation unit for receiving an incoming transmission signal, for classifying a data frame of the signal in accordance with a predefined classification of the data transmission rates, and for determining from the results of the classification an estimate of the data transmission rate of the received data frame;

wherein the rate estimation unit is arranged to classify the received signal based on a power spectral density function estimate of the received transmission signal; and

wherein the classification comprises further:

calculating a variable from the power spectral density function for characterising the frequency content of the power spectral density function; and

comparing the variable against limit values of a classification decision structure, wherein the variable characterising the frequency content of the received transmission signal comprises center-of-moment of the power spectral density function.

33. (New) A mobile station including signal receiving circuitry arranged for use in communication via a communication system with variable data transmission rates wherein data is transmitted as a plurality of data symbols over a sequence of data frames, the signal receiving circuitry comprising a rate estimation unit for receiving an incoming transmission signal, for classifying a data frame of the signal in accordance with a predefined classification of the data transmission rates, and for determining from the results of the classification an estimate of the data transmission rate of the received data frame;

wherein the rate estimation unit is arranged to classify the received signal based on a power spectral density function estimate of the received transmission signal; and

wherein the classification comprises further:

calculating a variable from the power spectral density function for characterising the frequency content of the power spectral density function; and

comparing the variable against limit values of a classification decision structure, wherein the variable characterising the frequency content of the received transmission signal comprises center-of-moment of the power spectral density function.

34. (New) A base station including signal receiving circuitry for use in communication with variable data transmission rates wherein data is transmitted as a plurality of data symbols over a sequence of data frames, the signal receiving circuitry comprising a rate estimation unit for receiving an incoming transmission signal, for classifying a data frame of the signal in accordance with a predefined classification of the data transmission rates, and for determining from the results of the classification an estimate of the data transmission rate of the received data frame;

wherein the rate estimation unit is arranged to classify the received signal based on a power spectral density function estimate of the received transmission signal; and

wherein the classification comprises further:

calculating a variable from the power spectral density function for characterising the frequency content of the power spectral density function; and

comparing the variable against limit values of a classification decision structure, wherein the variable characterising the frequency content of the received transmission signal comprises center-of-moment of the power spectral density function.